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HINTS FOR THE INQUIRY INTO THE PREVALENCE
OF THE ANCHYLOSTOMA IN INDIA

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dence, it is, I think, difficult to believe that defective sanitation in India is the sole cause, and the whole cause of enteric fever as seen in India for, while on the one hand we can in India but seldom prove a causal connection between the disease and sewage contamination of food or drink, there is, I think, on the other hand, a vast array of positive evidence to show that a fever with enteric symptoms closely simulating true enterica (Tables I and II) has been and can be caused by other factors—factors which I believe are as yet not sufficiently recognised, although spasmodic efforts have been made from time to time by a minority of original thinkers to show that they do exist, and it may reasonably be asked whether, with our advancing knowledge of the subject, the time has not come for medical men in India, whatever may be their past or present convictions, to consider both individually and collectively the various points enumerated above and to decide whether the disease we call “enteric fever” in India is always one disease arising from one cause only or a complex disease presenting several phases and arising from a variety of causes, chief among which may be mentioned climate, food, and intestinal intoxication from fermentation and putrefaction of intestinal contents and the consequent formation of ptomaines and toxins therein of bacterial origin though quite independently of the typhoid bacillus, for it must be obvious that, without correct premises, without a correct conception of the disease, and without an absolute unanimity among medical men as to what constitutes a correct conception of the disease, the inferences must be wrong, and that there never can be any satisfactory solution of a complex and difficult subject like the enteric question.

¹ Poore's Milroy Lectures, *British Medical Journal*, February, 1899.

² Major Davies' Report published in Annual Report of the Sanitary Commissioner, Government of India, for 1897.

³ Dr. Cousin's presidential address at Portsmouth at the Annual Meeting of the British Medical Association.

⁴ Davidson's Hygiene and Diseases of Warm Climates.

⁵ *British Medical Journal*, May 6th, 1899.

⁶ The same might be said in Europe—ED., *I. M. G.*

⁷ Annual Report, Sanitary Commissioner, Government of India, 1886.

⁸ Houston's Report, *British Medical Journal*, January 14th, 1899.

⁹ Annual Report, Sanitary Commissioner, Government of India, 1892. Extracts from Reports of Medical Officers (Dr. Boileau).

¹⁰ Annual Report, Sanitary Commissioner, Government of India, 1891.

¹¹ Ander's Medicine, 1898.

¹² *Ibid.*

¹³ Brunton's Disorders of Digestion, 1893.

¹⁴ *Ibid.*

¹⁵ Ander's Medicine, 1898.

¹⁶ Ross's Entero-septic Fevers, *Indian Medical Gazette*, 1892.

¹⁷ Spencer's article. Diagnosis and Treatment, Enteric Fever, *Indian Medical Gazette*, December, 1892.

¹⁸ Dr. W. J. Buchanan's paper on Terminal Dysentery, Annual Meeting, British Medical Association, 1899.

HINTS FOR THE INQUIRY INTO THE PREVALENCE OF THE ANCHYLOSTOMA IN INDIA.

By L. ROGERS, M.D., F.R.C.S.,
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At the request of the Editor, *Indian Medical Gazette*, I have drawn up the following hints for the working of the scheme of a collective inquiry into the prevalence and harmfulness of the intestinal parasite known as the anchylostoma duodenale in the various districts of India and Burma.

Our present knowledge is limited and is mainly due to the labours of Giles and Dobson, the wide divergence of whose views shows how much we have still to learn about it. As there may be some observers who have not paid sufficient attention to the subject to allow of their answering some of the questions without further study, these brief suggestions as to the best means of simply investigating the subject are here given.

It is particularly in cases of malarial anæmia in which the anchylostoma may be found that it is very difficult to decide if the latter is a definite and important contributing factor in the production of the anæmia or only an accidental feature.

An examination of the blood will often allow of a correct inference being drawn and an important guide to correct treatment being obtained. The percentage of hæmoglobin should be estimated, and the number of red and white corpuscles per cubic millimetre ascertained, these estimations being made at the same time in healthy people, as a control, for the standard, more particularly of the hæmoglobin, in natives of many parts of India is much lower than the European standard, a point which is worthy of more study than it has yet received in this country. The characteristic features of the type of the anæmia in pure anchylostomiasis are, firstly, that the hæmoglobin is reduced to a much greater degree than the number of the red corpuscles, so that the amount of hæmoglobin in each corpuscle falls much below the normal, being always, in my experience, less than 0.5 of the normal; secondly, the white corpuscles though absolutely reduced in numbers are relatively to the red, slightly increased, being 1 to 300 or 400. In the anæmia of chronic malaria, on the other hand, the hæmoglobin and number of the red corpuscles are much more equally reduced, the hæmoglobin value being always over 0.5, while the number of the white corpuscles (in the absence of leucocytosis during fever) are considerably reduced relatively to the red, the proportion being about 1 to 1,000 or even 1 to 2,000. The specific gravity is also more reduced, relatively to the

degree of anæmia, in anchylostomiasis, than in malarial anæmia. In cases where the anæmia is produced by the combined action of both malaria and anchylostomiasis, the type of the anæmia will be intermediate between those of the two primary diseases.

The following hints on methods of investigation may be found useful:

1. The examination of the faeces for the ova of the worm. A good way of doing this is to dilute a small piece of the motion with a drop of (1 in 20) carbolic acid, which removes all smell. If no ova of the parasite are found by a systematic search with the microscope ($\frac{3}{4}$ inch), it may be taken as pretty certain that there are less than twenty of the worms present, if any, and thymol is not indicated even if anæmia is present. The only common ovum, which from its thin capsule, clear unstained contents and oval outline, is liable to be mistaken for the anchylostoma is the oxyuris, but the young worm can be seen to be curled up inside them, which is never the case in the anchylostoma. The numbers found will afford a rough indication of the number of worms present in the intestine.

2. Counting the worms passed after the administration of thymol. In order to obtain accurate information as to the number of worms in healthy and diseased persons a 20 to 30 grain dose of thymol should be given, and repeated at the end of three hours; all the motions passed for the next twenty-four hours being kept for examination. A piece of muslin should now be fastened over the top of a kerosene tin, so that it sags down slightly, the motion should be placed on this and water poured slowly on it, while it is being stirred up until all the colour has been removed and only husks of grain and other solid material remains. This should now be placed in a shallow flat dish of tin with a layer of water. On slightly stirring up the detritus with a piece of wood, the white glistening anchylostomata worms can easily be picked out, the smaller ones with finely branched tails being the males. Thymol should never be given to advanced cases of malarial cachexia or dysentery for diagnostic purposes, but only when the ova have been found to be numerous in the faeces by microscopical examination, then the drug must be used with caution, as this drastic form of treatment may be very dangerous in such cases.

PARASITES FOUND ON MOSQUITOS.

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EVERY one who lives in the tropics has experienced both the buzz and the bite of the



